



THE UNIVERSITY OF ARIZONA  
TUCSON, ARIZONA 85721

COLLEGE OF AGRICULTURE  
DEPARTMENT OF WATERSHED MANAGEMENT

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Mr. Burton B. Schardt  
ERTS Program Manager  
Code ER, NASA Headquarters  
Washington, D.C. 20546

Subject: Progress Report (Type II)  
(April 1, 1973 - September 30, 1973)

Contract NAS5-21820

- a. Use of Earth Resources Technological Satellite (ERTS) Data in a Natural Resource Inventory (SR099).
- b. GSFC - UN 620
- c. Ernest B. Fish, previous Principal Investigator, left the University of Arizona for employment at Texas Tech University in early July. The current Principal Investigator and a graduate assistant are collecting the ground truth data in the field. We do miss Ernest Fish's help.
- d. The main emphasis during the reporting period has been field sampling of taxonomic units. One hundred and seventy sites have been sampled for vegetation, soil, and topographic characteristics.

Some preliminary analyses also have been accomplished to quantify the drainage and topographical patterns which contribute to identification of our designated mapping units or areas. A drainage density index has been determined for nine different areas mapped on 1:30,000 scale imagery and the proportion of each area which is ridge, bottom, north slope, etc. has also been determined. The proportion of the area which is represented by each topographical position was determined by dot counts. The drainage density index was determined on the imagery by counting the number of channels which intersect the line marking the circumference of a circle, this circumference representing one mile at the scale of imagery. The shape of the sampling device is unique in

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(E73-11159) USE OF EARTH RESOURCES  
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that it avoids bias due to orientation. Intersecting channels are recorded according to stream order of one through X with one being the smallest recognizable channel on the imagery.

The following data are summarized for nine areas:

Data Set 1

Area #	Size Acres	Percent							Drainage Density Index	
		Ridge	B	N	S	W	E	Slope	Mean	$\bar{x}$
6	3319	16.1	13.7	34.0	28.4	3.5	4.4	70.2	3.11	.39
3	4190	17.6	23.7	22.5	21.4	8.2	6.5	58.7	4.88	.23
17	2812	14.7	20.3	15.4	21.3	12.2	16.1	65.0	8.33	.99
9	2842	16.3	24.9	27.5	22.7	4.0	4.7	58.8	12.33	1.05
10	1271	16.7	25.4	32.0	7.9	6.4	11.6	57.9	18.25	.95
13	1406	23.9	23.9	26.3	20.0	2.1	2.8	52.2	4.50	1.04
15	4960	16.3	21.5	25.1	21.5	6.6	8.9	62.2	10.17	1.72
12	1449	15.1	21.8	25.7	21.8	7.8	7.9	63.1	10.25	.48
14	759	13.8	22.1	20.6	20.6	14.2	8.7	64.1	8.50	.50

Areas 14 and 17 are similar with respect to drainage indices and proportion of the area falling in each topographical position. Areas 12 and 15 also have similar drainage indices and proportion of topographic positions within the areas. Each of these pairs of areas, then should be suited for similar land uses and management. Our ground truth data should correlate with these findings.

Some preliminary analyses of cover data by topographical position have been made to determine if our cover estimates relate to imagery. The following data are averages for 57 field samples in nine mapping units.

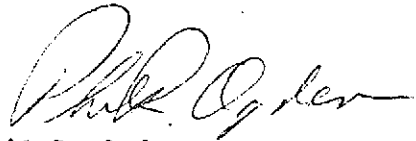
Data Set 2

SUMMARY OF COVER DATA BY TOPOGRAPHICAL POSITION

POSITION	Percent						
	TREES	SHRUBS	HERBS	LITTER	SMALL ROCK	BIG ROCK	BARE
Ridgetop	0.0	6.1	21.5	10.0	31.4	3.9	26.3
Bottom	0.0	2.8	33.1	17.4	12.8	1.7	32.4
N Slope	2.8	5.6	33.9	18.1	23.8	5.2	10.7
S Slope	0.0	5.9	26.1	13.6	35.1	5.5	13.2

Ridges consistently show light on imagery. Herbaceous cover and litter are lowest on the ridges compared to other topographic positions. Bare soil was not as high as on bottom lands but this was due to the high proportion of small rocks (less than 3-inch diameter) on ridge tops. Grazing is generally greatest on ridges and bottoms. Our field data correlate well with photo images.

- e. Not applicable at this time.
- f. None
- g. None
- h. None
- i. None
- j. None
- k. None



Phil R. Ogden  
Principal Investigator